



Technical Data Sheet

DOWSIL™ TC-4040 Dispensable Thermal Pad

Two-part, 1-to-1 mix ratio, blue color, thermally conductive dispensable thermal pad

Features & Benefits

- Liquid and curable thermal gel to form a soft thermal pad to help gap filling, heat dissipating, stress relieving and shock damping
- 4.0 W/mk thermal conductivity to help device thermal design
- Dispensed or printed through a variety of manual or automated processes
- Room temperature or heat to accelerate curing
- UL listing: UL94 V0
- Lower cost of ownership than fabricated pad

Composition

- Two-part
- Polydimethylsiloxane with thermal filler

Applications

- Thermal interface and gap filling materials for heat conductive

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Test ¹	Property	Unit	Result
	One or two-part		Two
	Part A Color		White
	Part B Color		Blue
	Color Mixed		Blue
ASTM D1084	Viscosity Part A	cPs	320,000
ASTM D1084	Viscosity Part B	cPs	350,000
ASTM D2452	Extrusion Rate Mixed @ 90 Psi	g/min	350
ASTM D1475	Specific Gravity (Uncured)		3.2
CTM 0092A	Working Time at 25°C	hour	3
	Curing Time at 25°C	hour	24
	Curing Time at 80°C	min	60
	Curing Time at 120°C	min	< 5

1. ASTM: American Society for Testing and Materials.
CTM: Corporate Test Method, copies of CTM's are available on request.

Typical Properties (Cont.)

Test	Property	Unit	Result
ASTM D2240	Durometer	Shore 00	60
ASTM D412	Tensile Strength	MPa	0.42
ASTM D412	Elongation	%	30
ASTM F433 Hot Disk	Thermal Conductivity	W/mK	4.0
	Min Bond Line Thickness	µm	60
ASTM D149	Dielectric Strength	kV/mm	10.2
ASTM D150	Dielectric Constant at 100 Hz		7.4
	Dissipation Factor at 100 Hz		0.0143
ASTM D1169	Volume Resistivity	Ohm*cm	3.95 E + 13
UL94	UL Flammability Classification	UL94	V-0
	Shelf Life	month	6

Description

DOWSIL™ TC-4040 Dispensable Thermal Pads are supplied as two-part liquid component kits. When the liquid components are thoroughly mixed, the mixture cures to a flexible elastomer, suitable for the protection in electrical/ electronic applications where heat dissipation is needed. It is mixed to form a low flowable paste that can be pressed to 100 µm thickness for thermal management. DOWSIL™ TC-4040 Dispensable Thermal Pad can be applied between heat source and heat dissipation parts. It can be cured in place for heat conductive and gap filling. These materials cure without exotherm at a constant rate regardless of sectional thickness or degree of confinement. DOWSIL™ thermally conductive elastomers require no post-cure, and can be used immediately at severe operating temperatures of -45 to 200°C (-49 to 392°F) after curing. Cured DOWSIL™ TC-4040 Dispensable Thermal Pad exerts ultra low stress to devices and improves devices reliability.

Application Methods

- Automated or manual dispensing
- Printing

Mixing and De-Airing

DOWSIL™ TC-4040 Dispensable Thermal Pad is thoroughly degassed when prepared. It may exhibit minor polymer separation during transportation. We recommend degassing and agitating part A and part B respectively before use to achieve homogeneous material. Automated airless dispense equipment can be used to reduce or avoid the need to degas. Two-part materials should be mixed in the proper ratio either by weight or volume. Commonly available 18-24 elements static mixer is recommended for auto-mixing during process.

Processing/Curing

DOWSIL™ TC-4040 Dispensable Thermal Pad is addition cure thermal conductive gap filler. It starts curing slowly after being mixed and dispensed on substrates at room temperature. Curing extent increases over time, which means higher pressure is needed when pressing the gel to a certain thickness. The working time depends on the highest pressure applied on the devices allowed by the application.

**Processing/Curing
(Cont.)**

Addition-curing materials contain all the ingredients needed for cure with no by-products. Deep-section or confined cures are possible. DOWSIL™ TC-4040 Dispensable Thermal Pad can be cured at 25°C in 24 hours. Increasing curing temperature can shorten the curing. Typically, DOWSIL™ TC-4040 Dispensable Thermal Pad can be cured at 80°C in 60 min. When curing temperature is increased to 120°C, mixed DOWSIL™ TC-4040 Dispensable Thermal Pad can be cured in less than 5 min.

**Pot Life and Cure
Rate**

Cure reaction begins with the mixing process. Initially, cure is evidenced by a gradual increase in viscosity, followed by gelation and conversion to its final state. Pot life is defined as the time required for viscosity to double after parts A and B (base and curing agent) are mixed. Generally, DOWSIL™ TC-4040 Dispensable Thermal Pad has 3 hours of pot life at room temperature after mixing.

**Useful
Temperature
Ranges**

For most uses, silicone elastomers should be operational over a temperature range of -45 to 200°C (-49 to 392°F) for long periods of time. However, at both the low- and high temperature ends of the spectrum, behavior of the materials and performance for particular applications can become more complex. The material should be adequately tested for the particular end use environment. For low-temperature performance, thermal cycling to conditions as low as -55°C (-67°F) may be possible but performance should be verified for your parts or assemblies. Factors that may influence performance are configuration and stress sensitivity of components, cooling rates and hold times, and prior temperature history. At the high-temperature end, the durability of the cured silicone elastomer is time- and temperature- dependent. As expected, the higher the temperature, the shorter the time the material will remain usable.

**Handling
Precautions**

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

**Usable Life and
Storage**

Shelf life is indicated by the "Use Before" date found on the product label. Refer to the product label for storage temperature requirements. The product should be stored in its original packaging with the cap tightly closed to avoid any contamination. DOWSIL™ TC-4040 Dispensable Thermal Pad has 6 months shelf life after the manufacturing date.

**Packaging
Information**

Multiple packaging sizes are available for this product. Please contact your local distributor or Dow representative for information on packaging size and availability.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

**Health and
Environmental
Information**

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

How Can We Help You Today?

Tell us about your performance, design, and manufacturing challenges. Let us put our silicon-based materials expertise, application knowledge, and processing experience to work for you.

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To discuss how we could work together to meet your specific needs, go to **dow.com** for a contact close to your location. Dow has customer service teams, science and technology centers, application support teams, sales offices, and manufacturing sites around the globe.

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